



Student Name: _____

Class: _____

Due Date: _____

Introduction

Welcome to this worksheet on understanding probability, focusing on the union and intersection of events. This activity is designed for 14-year-old students to learn and apply the concepts of probability in real-life scenarios. By the end of this worksheet, you will be able to define and identify union and intersection of events, calculate probabilities, and apply these concepts to practical problems.

Essential Understanding:

- Define the union of two events, A and B.
- Define the intersection of two events, A and B.
- What is the formula for calculating the probability of the union of two events, $P(A \cup B)$?
- What is the formula for calculating the probability of the intersection of two events, $P(A \cap B)$, if A and B are independent?

Complete these concept checks:

1. Define the union of two events, A and B, and provide an example.

2. Define the intersection of two events, A and B, and provide an example.

Scenario 1: Probability of Union

If $P(A) = 0.3$ and $P(B) = 0.4$, and A and B are mutually exclusive, calculate $P(A \cup B)$.

Scenario 2: Probability of Intersection

If $P(A) = 0.2$ and $P(B) = 0.5$, and A and B are independent, calculate $P(A \cap B)$.

Scenario 3: Real-Life Application

A card is drawn from a standard deck of 52 cards. What is the probability that the card is either a heart or a king?

Choose ONE of these topics for detailed research:

1. A company has 200 employees, and 120 of them are men. If 40 employees are managers, and 20 of them are men, what is the probability that an employee is either a man or a manager?

2. A city has 500,000 residents, and 200,000 of them are registered to vote. If 150,000 residents are over 18 years old, and 100,000 of them are registered to vote, what is the probability that a resident is either registered to vote or over 18 years old?

Choose any combination:

1. If $P(A) = 0.6$ and $P(B) = 0.3$, and A and B are mutually exclusive, calculate $P(A \cup B)$.

2. If $P(A) = 0.4$ and $P(B) = 0.2$, and A and B are independent, calculate $P(A \cap B)$.

Conclusion

Congratulations on completing this worksheet on understanding probability, focusing on the union and intersection of events. You have learned to define and identify these concepts, calculate probabilities, and apply them to practical problems. Remember that probability is all around us, and understanding these concepts can help you make informed decisions in various aspects of life.

Additional Resources

For further learning and practice, you can use online resources such as probability calculators, simulations, and games. You can also explore real-life scenarios where probability is applied, such as insurance, medicine, and engineering.

Union of events: The event that occurs if either A or B or both occur.

Intersection of events: The event that occurs if both A and B occur.

Probability: A measure of the likelihood of an event occurring, expressed as a number between 0 and 1.

Independent events: Events where the occurrence of one does not affect the probability of the other occurring.

Mutually exclusive events: Events that cannot occur at the same time.

